

San Carlos Goshawk Inventory Project

Final Report on Arizona Game and Fish Department Heritage Grant #I94008

Amanda Moors, Project Coordinator

December 17, 1996

DISCLAIMER

The findings, opinions, and recommendations in this report are those of the investigators who have received partial or full funding from the Arizona Game and Fish Department Heritage Fund. The findings, opinions, and recommendations do not necessarily reflect those of the Arizona Game and Fish Commission or the Department, or necessarily represent official Department policy or management practice. For further information, please contact the Arizona Game and Fish Department.

Acknowledgments: This project was partially funded by Arizona Game and Fish Department Heritage Grant #I94008. The San Carlos Wildlife Management Program and the San Carlos Forestry Program provided all additional funding. Jeff Feen wrote the original grant and coordinated the first training session. Tim Wilhite and Steve Thompson were invaluable in helping to coordinate this project. This work would not have been possible without the hard work of the following field technicians: Jay Antonio, David Brown, Jafus Classay, Jason Dillon, Fred Henry, Matt Hopkins, Robson Pike, James Reede, Matt Rustin, Otto Rustin, and Jayson Stanley.

Introduction

The northern goshawk (*Accipiter gentilis atricapillus*) is a candidate species for the Arizona Game and Fish Department's list of threatened native wildlife. The U. S. Fish and Wildlife Service previously listed the northern goshawk as a Category 2 species and the U. S. Forest Service considers it a sensitive species. The northern goshawk typically nests in forests with large deciduous, mixed, or coniferous trees (Ingraldi and MacVean 1994a, Reynolds et al. 1982 in Ingraldi and MacVean 1994b, Reynolds et al. 1992 in Ingraldi and MacVean 1994a). Because timber management practices can alter forest structure and composition, some concern has been raised regarding the influence of logging on goshawk habitat.

The goshawk was first confirmed to be nesting on the reservation in 1993. However, no organized surveys had been conducted prior to 1995. The objectives of this project were to:

- 1). Train personnel on the reservation in the techniques used to survey goshawks
- 2). Survey forest areas, especially areas slated for timber sales, of the reservation for northern goshawks
- 3). Locate and monitor nest sites
- 4). Gather data on stand characteristics of the nesting areas and use that data to develop conservation strategies

Study Area and Methods

The San Carlos Apache Reservation is an extremely ecologically diverse piece of land in east-central Arizona. It comprises roughly 1.8 million acres of land ranging in elevation from approximately 3500' to 8000'. The biotic communities that are found here include: Sonoran desert scrub, grassland, oak woodland, pinon-juniper woodland, ponderosa pine forest, mixed conifer forest, and several types of riparian communities. There are several major rivers and lakes found on the reservation. Smaller creeks and stock ponds are also found scattered throughout the reservation.

Approximately 175,250 acres of the reservation is forested, and of this 55,120 acres is considered operable for logging. Goshawk surveys were focused in areas proposed for timber sales or that might be opened to logging operations in the future.

Training of personnel

Originally, this project was to have the first field season started in 1994. However, because the official signature date for this grant was August 30, 1994, we could not conduct surveys in 1994 as planned. We did begin our training sessions though; after we received word that the grant was accepted. On June 23, 1994, the project coordinator, wildlife planner, wildlife coop-student, natural resources specialist and 6 tribal technicians travelled to the Pinetop area to receive training on the identification and habits of goshawks as well as the survey methodology. That training was provided by Arizona Game and Fish and U.S. Forest Service personnel. In addition to classroom instruction, we were able to view live goshawks at an active nest site. The following day, the same people toured potential goshawk habitat on the reservation. These tours provided us with the needed training to conduct goshawk surveys. Immediately prior to the 1995 and 1996 field seasons, practice surveys

were run with the technicians and they were required to practice nest site measurements by measuring a fake nest site (supervised by the project coordinator). Technicians were given field guides and required to read articles about goshawk identification and life history and about other accipiters (e.g., Dunne et al. 1988, Tibbits 1989, Stallcup-unknown year-published in Point Reyes Bird Observatory Newsletter). The project coordinator discussed with the technicians how to identify goshawks, especially in relation to other accipiters. In previous years, the project coordinator spent numerous hours teaching several of the technicians how to identify all kinds of birds, not just raptors. The 1995 field season was conducted primarily by two technicians, but two others helped out occasionally. All of those technicians attended the previous training sessions. In the 1996 field season, we started out with four technicians that had previously been trained and whom had conducted goshawk surveys. Then in early June, five more technicians were hired. Beyond the same training as in 1995, the 1996 technicians received additional training in the identification of goshawks by examining the carcass of an adult goshawk found early in the summer of 1996. One of the new technicians had already been trained to conduct surveys at the Youth Practicum sponsored by the Native American Fish and Wildlife Society the previous summer. The new technicians were also able to see a live goshawk and nest during their training, as we had found that nest site the day they started. Technicians who had worked on the project the previous year were designated as crew leaders and the newer technicians were assigned to work with experienced personnel. Additionally, a full-time biological technician with years of raptor survey experience was the primary field coordinator in 1996, determining survey routes, overseeing field crews, and spending about 2 days each week in the field with the technicians. All sightings of goshawks or sightings of hawks that the technicians were unsure of the species were confirmed or resolved (i.e., determining that the hawk was not a goshawk) by the project leader.

The following information is provided because training of personnel to possibly continue with goshawk surveys was one of the objectives of this grant. Three of the personnel that were trained in goshawk surveys are full-time staff expected to stay with the tribe for some time. Of the field technicians hired for this project, approximately four are expected to continue working for this department. Because these technicians are trained in the identification of goshawks and they will be conducting other fieldwork for us, we will be able to gather information on goshawks as they find them in the course of other projects.

Survey methodology

Surveys were conducted according to the U.S. Forest Service's Southwestern Region protocol (USDA Forest Service 1993) as recommended by Arizona Game and Fish Department personnel. Tapes of goshawk alarm calls (during the nestling period) and wailing calls (during the fledgling period) were broadcast along transects using hand-held tape players amplified with powerhorns. Stations were placed approximately 300 m apart and at each station taped calls were broadcast in three directions (separated by 120 degrees). In each of the three directions, goshawk calls were broadcast for 10 seconds followed by 30 seconds of watching and listening for any goshawk response. This cycle was repeated twice at each station for a total of sixty seconds of calls played at each station. We focused transects on drainages based on information from Arizona Game and Fish Dept. personnel that most nests were associated with drainages. Most transects were walked, but a few transects (approximately 6 in 1995 and 1 in 1996) were placed on roads and technicians drove to each station and then got out and played the tape and watched for goshawks. Technicians searched for goshawks and goshawk sign as they walked in between stations. Daily survey data sheets (Appendix 1) were filled out and the locations of transects and stations were recorded on topographic maps. Survey routes, nest sites, and sightings were later

digitized into a GIS database. Information on weather, wildlife sign, and avian responses to the call were recorded at each station. Stations were placed along a drainage until technicians felt that the habitat was no longer appropriate for goshawk nest sites. A 25 m radius plot was established around known nest trees and the following vegetative information was collected for the plot: number of trees, diameter at breast height (dbh) of the ten largest trees, basal area, and canopy closure (Appendix 2). Nest site data collected included: nest tree species, slope at nest tree, aspect at the nest tree, aspect of nest, height of nest tree, height of nest in the tree, dbh of the nest tree, placement of nest in tree, size of sticks used in the nest (estimated), height and width of the nest structure (estimated) (Appendix 2).

In 1995, surveys were concentrated in and around a proposed timber sale in the Point of Pines Forest Management Unit and some surveys were done in the Hilltop Management Unit. Surveys began on June 6 and continued until August 31, 1995.

In 1996, survey operations were expanded to include the Hilltop and Malay Gap Forest Management Units and additional personnel were hired. Initially, we used a timber type GIS coverage to locate suitable habitat and prioritize surveys. However, it was found that the timber type queries did not sufficiently identify potential habitat and that approach was abandoned. Survey work began on May 13, 1996. Most of the survey work was completed by August 15, 1996. However, because of some adult and fledgling goshawk sightings in mid-August, surveys in the area of those sightings were continued until September 22, 1996.

Results and Discussion

In 1995, approximately 7,000 acres (calculated by placing a 200m radius effective survey zone around each station and including some areas checked but for which no tape was played) were checked for suitability for goshawks and tape recordings of goshawk calls were played where appropriate (Figs. 1 and 2). Information on previous goshawk sightings was collected and placed on topographic maps. Over one thousand person-hours were spent in the field looking for potential goshawk survey habitat and conducting surveys between June-September 1995. No goshawks were seen and no new nest sites were located. One nest site, that was last active in 1994, was measured.

The 1996 survey routes were placed in the Point of Pines, Hilltop, and Malay Gap Forest Management Units (Figs. 1, 2, and 3). Approximately 16,000 acres (calculated by placing a 200 m radius effective survey zone around each station) were covered during the 1996 field season. During Memorial Day weekend a dead adult goshawk was found near Freezeout tank; the goshawk died after getting tangled in some barbed wire fencing. The bird was found in an area not previously surveyed in the Malay Gap Forest Management Unit. Subsequent surveys there did not reveal another adult or a nest site. In mid-August, an adult and a fledgling goshawk were seen in the Hilltop Management Unit. Another adult goshawk was seen in mid-August approximately 2 miles away from the sighting of the adult and fledgling. These sightings were not made during surveys, but during other work conducted in the area. Survey effort was concentrated around those locations, however, no nest site was found.

On June 6, 1996 one active goshawk nest was located. This nest was located because an adult responded to the taped broadcast call. Data on nest site and nest characteristics were collected at the nest site. The nest was monitored several times subsequently, however, no adults or juveniles were seen near the nest. It is assumed that the nesting attempt failed.

Comparison of the nest site characteristics reveals some similarities and differences. Both were found in ponderosa pine (*Pinus ponderosa*) stands at approximately 6,000 ft elevation, had numerous trees within the 25 m radius plot, and had an average dbh greater than 18 inches (Table 1). However, nest site # 2 was a much more open site, as shown by the lower basal area and more open canopy (Table 1); the nest was in a tree that was essentially isolated, not in a group of large trees as often reported in the literature.

Table 1. Comparison of nest site characteristics within a 25 m radius plot around the nest tree.

Nest #	Year measured	elevation	# of trees	avg. dbh	basal area	canopy closure
1	1995	5750	124	18.61	170	51-75%
2	1996	6000	150	22.89	40	26-50%

Both nest sites had similar nest tree and structure features (Table 2). Both were in large ponderosa pine (*Pinus ponderosa*) on a gentle slope. Nest trees were greater than 80 feet tall and the nests were placed in the upper third of the tree (at about the 65 feet high). Both nests were the same width (2 feet), however the active nest was over twice as tall as the inactive nest, most likely because of new material being added to the active nest.

Table 2. Comparison of nest tree and nest structure characteristics.

Variable	Nest # 1	Nest # 2
tree species	ponderosa pine	ponderosa pine
slope at nest (percent)	3	7
aspect at nest tree	N	W
aspect of nest	E	SE
height of nest tree (feet)	98	82
height of nest in tree (feet)	68	63
DBH of nest tree (inches)	19.2	23.3
nest placement	in crotch	against bole
nest stick diameter (inches)	1/2	1/4-1
width of nest (feet)	2	2
height of nest structure (inches)	7	18

One of the objectives of this project was to develop management guidelines appropriate for the protection of northern goshawks on the San Carlos Apache Reservation. However, because only one inactive and one active nest was located, we do not have enough data to develop a habitat model for the northern goshawk on the reservation. Therefore, we must rely on the management recommendations of the U. S. Forest Service in the Southwestern Region (Reynolds et al. 1992). Those guidelines will be used as a basis for the management of the northern goshawk on the reservation until we have sufficient information to warrant a change. We also feel that the goshawk will benefit from the implementation of the pending tribal conservation plan for the Mexican spotted owl (*Strix occidentalis lucida*). Although the nesting habitat of spotted owls tends to include a very cluttered understory, the foraging habitat has more overlap with potential goshawk habitat. By retaining a portion of large trees in the foraging habitat, as called for by the conservation plan, we will also be providing some protection of potential goshawk habitat.

The methodology used for this project was very labor intensive and because of the limited number of nests found, is not considered cost effective. Because we found very few goshawks and much of the forested area on the reservation is not considered good goshawk habitat (by tribal and state biologists), we believe there is a low density of goshawks on the reservation. We do not know exactly why there are few goshawks on the reservation. It may be that there is not enough high-quality habitat. Goshawks primarily nest in mature stands of ponderosa pine with open understories (Ingraldi and MacVean 1994). Much of the reservation's forests are ponderosa pine with Arizona white oak (*Quercus arizonica*) and/or alligator juniper (*Juniperus deppeana*) in the understory, perhaps more cluttered than goshawks prefer. Additionally, much of the forested areas are comprised of dense, smaller-stemmed ponderosa pine stands rather than the more open, larger-stemmed mature ponderosa pine forests typically used by goshawks. This analysis of potential goshawk habitat is cursory and should not be considered as final. The active nest that we found was located in an area that would not be considered good goshawk habitat (as described in the literature). It may be that because of the limited habitat available, the goshawks are using somewhat marginal habitat. However, it is probable that there are more goshawks nesting on the reservation than we found in this survey (as evidenced by the adult and fledgling seen in an area with no nest found), even though we feel that most of what is considered the best habitat has been surveyed. Due to budget restraints it is unlikely that we will continue extensive surveys of this type for goshawks. However, information on sightings will be recorded as goshawks or nests are found. Because our field technicians are now trained in goshawk identification and because most of our sightings have been made while conducting other fieldwork, it is likely that we will be able to add to our goshawk sightings without conducting surveys using taped calls.

Literature cited

- Dunne, P., D. Sibley, and C. Sutton. 1988. *Hawks in Flight*. Houghton Mifflin Company, Boston, MA. 254 pp.
- Ingraldi, M.F. and S.R. MacVean. 1994a (Revised 1995). Nest-site selection by northern goshawks in a ponderosa pine forest in east-central Arizona. Nongame and Endangered Wildlife Program Technical Report 47. Arizona Game and Fish Department, Phoenix.
- Ingraldi, M.F. and S.R. MacVean. 1994b. Demography of northern goshawks in central Arizona. Final report for IIPAM Heritage Grant I93034. Nongame and Endangered Wildlife Program Technical Report 45. Arizona Game and Fish Department, Phoenix, Arizona.
- Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce, G. Goodwin, R. Smith, and E.L. Fishher. 1992. Management recommendations for the northern goshawk in the southwestern United States. USDA Forest Service General Technical Report RM-217, Fort Collins, CO.
- Reynolds, R.T., E.C. Meslow and H.M. Wight. 1982. Nesting habitat of coexisting *Accipiter* in Oregon. *Journal of Wildlife Management* 46:124-138.
- Tibbits, T. 1989. Goshawk - Nongame Field Notes. Arizona Wildlife Views. Arizona Game and Fish Department. Phoenix, Arizona.
- USDA Forest Service. 1993. Southwest region northern goshawk inventory protocol. Interim Directive #R3 2670-93-1. USDA Forest Service, Alb., NM. 18pp.

**SAN CARLOS APACHE TRIBE
DAILY GOSHAWK SURVEY LOG**

Date: ____/____/____

Observers: _____

Time survey started: _____ Time survey ended: _____

Type of survey (circle one): foot vehicle both foot and vehicle

Weather during survey (this will have to be a general average of the weather conditions during the day):

% cloud cover: _____ wind (beaufort scale): _____

temperature: _____ precipitation: none light moderate heavy

of points where the tape was played: _____

of goshawk responses: _____

if any goshawks were heard or seen, please describe response:

Describe the area surveyed (explain where the transects were placed): _____

*******Mark the area surveyed on a topo map with the date that it was surveyed
(should be placed on a map with all other survey areas labelled on it)*******

Describe any changes in survey protocol that were necessary during this survey:

**SAN CARLOS APACHE TRIBE
DAILY GOSHAWK SURVEY LOG**

This page is to be used to list responses at individual calling locations:

Give a key to transect numbers in the descriptions of the transects on the previous page.

Date: ____/____/____

[illegible]

Goshawk Nest Site Record

San Carlos Apache Reservation

Page 1 of 2

Observer(s): _____ Date: ____/____/____

Nest # _____

Year this nest was located: _____

Last year this nest was active: _____

Location and Site Description (attach copy of topo map)

UTM N: _____ UTM E: _____ (GPS or from topo?)

USGS 7.5 min Quad Name: _____ Elevation: _____

Directions to Nest (provide mileage from intersections and distance and azimuth to nest tree from identifiable reference)

Establish a 25m radius plot around the nest tree and collect the following info. :

Habitat description (understory and overstory):

number of trees in plot : _____

DBH of ten largest trees ≥ 50 feet tall:

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

average DBH of the trees in the plots (calculated later): _____

BA of plot : _____

ESTIMATE the canopy closure of the plot (circle one of the following categories):

1-25% 26-50% 51-75% 76-100%

NEST TREE Information:

Page 2 of 2

nest tree species: pond. pine other: _____

slope at nest tree: _____ aspect : _____ aspect of nest: _____

height of nest tree: _____ height of nest in the tree: _____ DBH of nest tree: _____

nest placement : against bole? _____ if not, # feet away from bole: _____

Describe nest characteristics: stick size (diameter) : _____ size of nest : height _____ width _____

Describe behavior of the adults while at the nest site: _____

Did you see any young in the nest? _____ If yes, how many?: _____

Describe behavior and appearance of the young: _____

Did you see any nests that you think could be alternate nest sites for the goshawks? _____

If yes, describe location of alternate nest from the currently used nest (Distance and azimuth)? :

Comments (please describe anything else you think is relevant, such as description of unusual markings of the adults or injuries, etc.)